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THE PLANT DISEASE REPORTER

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Division of Mycology and Disease Survey

Volume XXI Number 14

August 1, 1937

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XXI Number 14

August 1, 1937

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JANUARY TEMPERATURES IN RELATION TO THE DISTRIBUTION AND SEVERITY OF DOWNY MILDEW OF TOBACCO

Paul R. Miller

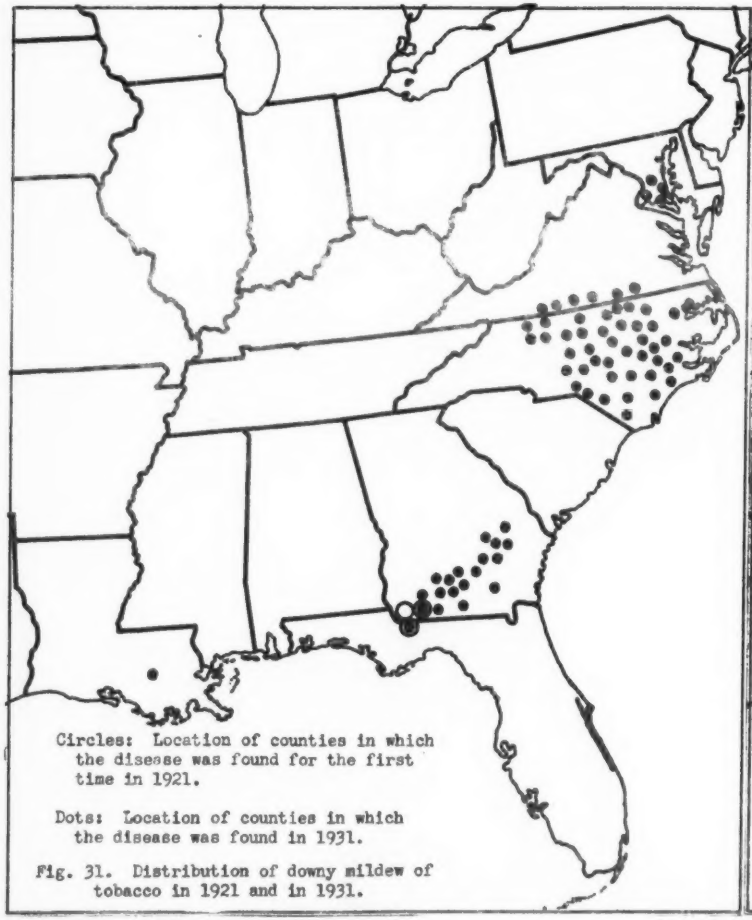
The history of the development of downy mildew of tobacco, caused by Peronospora tabacina, since its first appearance in the United States in 1921 is shown graphically on the accompanying maps, Figures 31 to 35. The reports upon which these maps were based have all been presented in the Plant Disease Reporter for the years concerned.[1/] A summary of the spread of the disease up to and including 1935 was given by Stevens and Wood in the article from which the first four maps are taken.[2/]

As is well known, the first appearance of downy mildew in this country was in the shade tobacco area of Florida and Georgia in 1921 (Fig. 31). The disease was not observed again until 1931 when it appeared in the same region and this time spread as far north as southern Maryland. There are no published reports from South Carolina in that year but verbal reports make it seem likely that it occurred there. In subsequent years the range was extended as is shown in the maps.

The rate of spread and the amount of damage varied considerably from one year to another. Up to the present season the years of greatest spread and damage were probably 1932 and 1933, while during 1934, 1935, and 1936 there was an apparent recession in both range and severity. It is of interest to note that in 1935, although the disease was looked for carefully in Tennessee where it was first observed in 1933 and was widespread during that year, the only places where it was found were the two new counties indicated in Figure 34. In 1936, generally speaking, interest in downy mildew probably reached its lowest ebb since the reappearance of the disease in 1931, as evidenced by the few reports received by the Plant Disease Survey. However, (Fig. 35), it was observed in Kentucky for the first time in a locality not very far from the new locations in Tennessee in 1935.

1/ Plant Dis. Bul. 5:18-19. 1921.
Plant Dis. Bul. Suppl. 22:400. 1922.
Plant Dis. Reprtr. 15:32-33, 43-45, 57-58, 61, 72, 85. 1931.
16:16, 25-27, 50-54, 55, 69-70, 94-96, 103. 1932.
17:16, 19, 28-31, 36-39, 45, 60-61, 63, 104, 163. 1933.
18:6, 33, 49. 1934.
19:36, 99, 104, 193, 297. 1935.
20:56, 92, 136, 142, 172, 188. 1936.
21:27, 42, 47, 107-108, 130-133, 174, 182-185, 218, 226, 227, 235, 245-246. 1937.

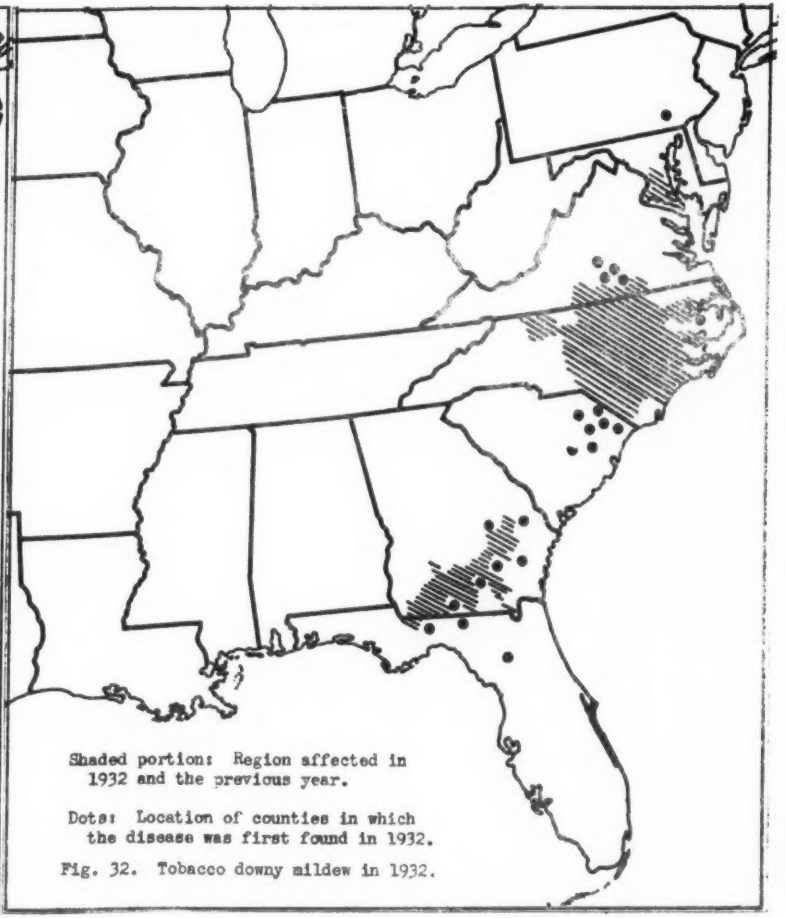
2/ Stevens, Neil E., and Jessie I. Wood. Recent fluctuations in plant diseases in the United States. Bot. Rev. 3:277-306. June 1937.



Circles: Location of counties in which the disease was found for the first time in 1921.

Dots: Location of counties in which the disease was found in 1931.

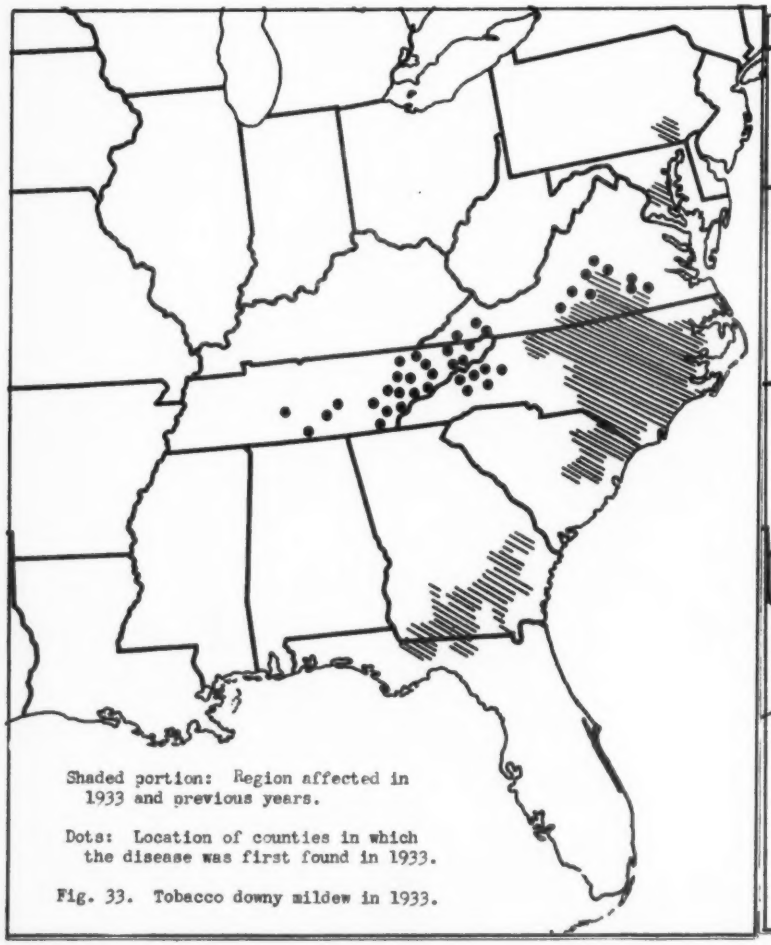
Fig. 31. Distribution of downy mildew of tobacco in 1921 and in 1931.



Shaded portion: Region affected in 1932 and the previous year.

Dots: Location of counties in which the disease was first found in 1932.

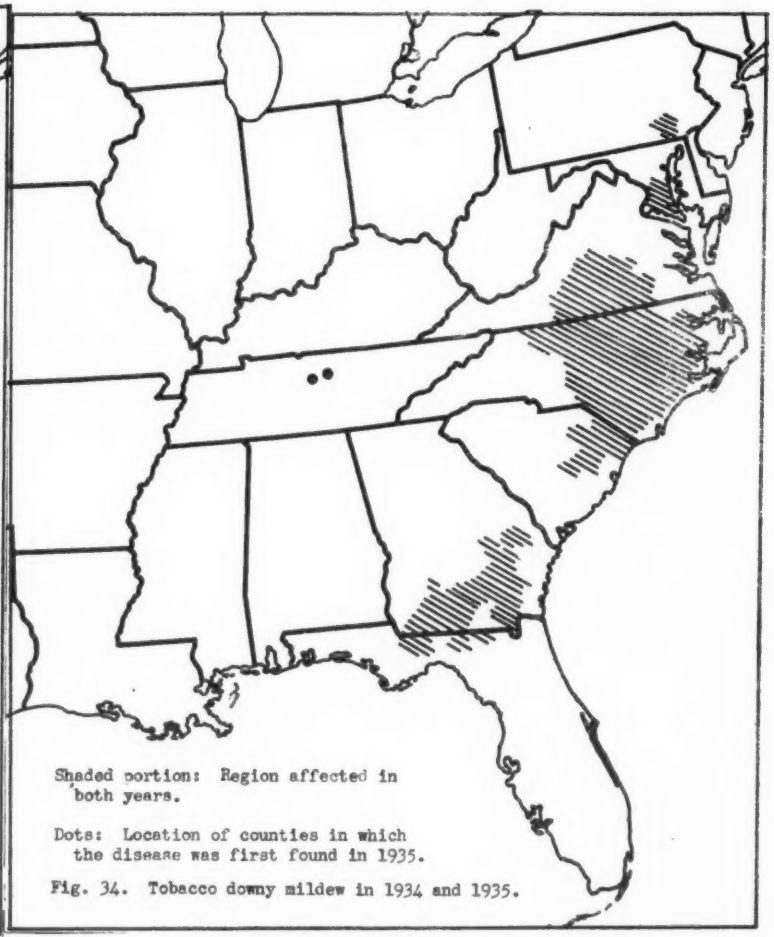
Fig. 32. Tobacco downy mildew in 1932.



Shaded portion: Region affected in 1933 and previous years.

Dots: Location of counties in which the disease was first found in 1933.

Fig. 33. Tobacco downy mildew in 1933.



Shaded portion: Region affected in both years.

Dots: Location of counties in which the disease was first found in 1935.

Fig. 34. Tobacco downy mildew in 1934 and 1935.

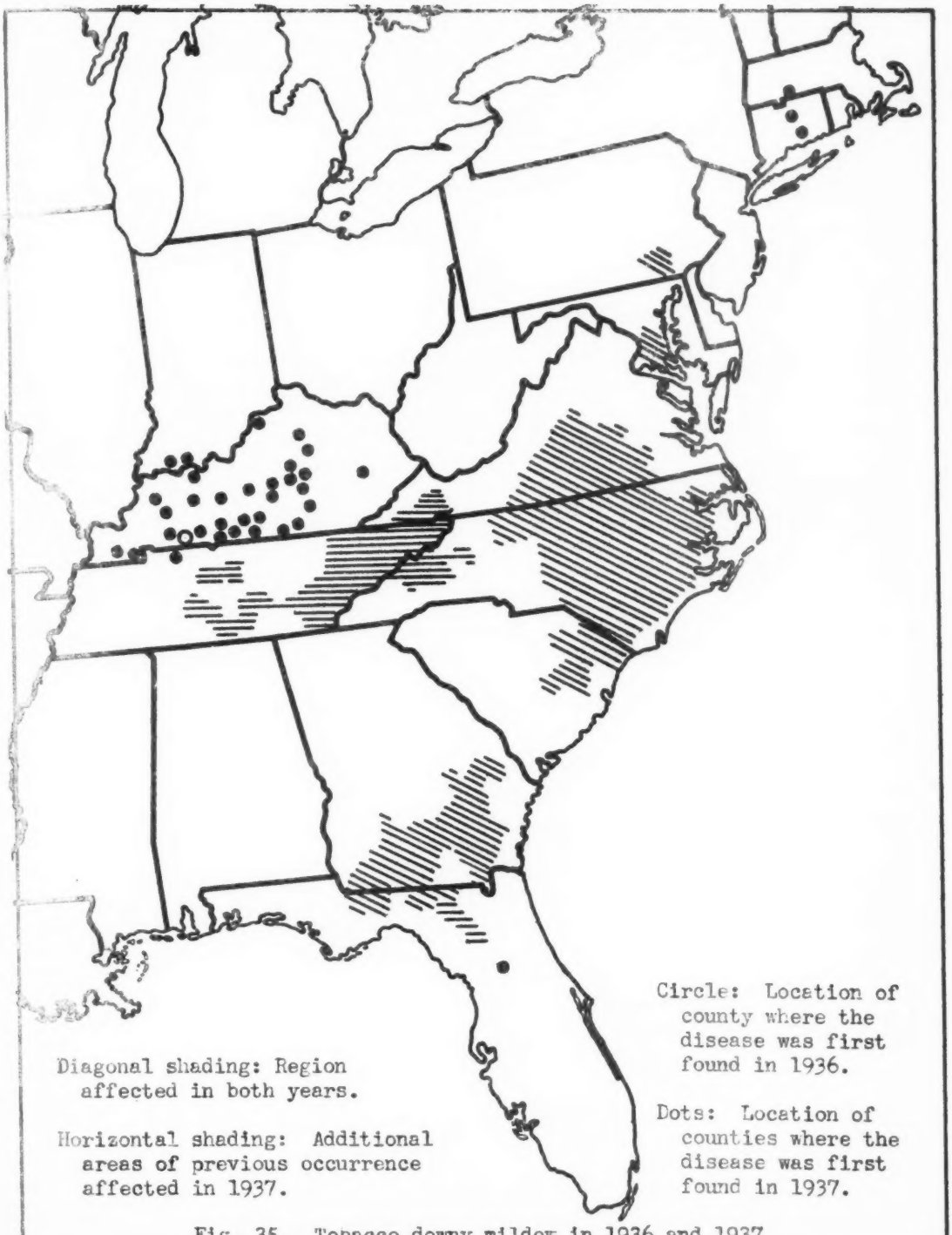

Diagonal shading: Region affected in both years.
Horizontal shading: Additional areas of previous occurrence affected in 1937.
Circle: Location of county where the disease was first found in 1936.
Dots: Location of counties where the disease was first found in 1937.

Fig. 35. Tobacco downy mildew in 1936 and 1937

In 1937 there was a complete change in the situation. Not only was downy mildew more widespread than ever before but in certain areas it was also much more destructive. The disease was found for the first time in Indiana, Connecticut, and Massachusetts, it spread practically throughout the tobacco area of Kentucky, it was much more widespread in Tennessee than ever before, and it occurred again in western Virginia and western North Carolina where it had not been reported since 1933 (Fig. 35). In these regions it was, although general, not particularly destructive. In Georgia, North and South Carolina, and parts of Virginia, however, it was both very prevalent and very severe, affecting practically every seed bed observed and causing heavy loss of plants. (P.D.R. 21:107-108, 130-133, 184-185, 245.)

These statements concerning prevalence and severity in 1937 are based upon a survey during which about 2,000 plant beds throughout most of the tobacco-growing area were observed, bearing in mind the following points: the dates of first appearance and the amount and damage of downy mildew in old beds as compared with new beds, in plant beds located in the open fields as compared with those in the shade, low, and wooded areas, and in plant beds where stands were thin as compared with those where stands were thick. The results of this survey showed that macroscopically the disease appeared first on as many new beds as old ones, and that as far as could be seen the amount of damage was equal in both cases. As many beds were found to be infected in the open as in shaded and wooded areas, and as far as could be observed there was no difference in the amount of mildew between beds with thick and those with thin stands.

The outstanding impression gained throughout the survey was that the amount of damage caused by downy mildew in any given locality seemed to be closely related to the earliness of the first signs of infection within that locality. (P.D.R. 21:185, 245.)

The yearly fluctuations in the severity of the disease have already been mentioned. In an attempt to explain these fluctuations, weather records have been extensively studied. Such factors as rainfall, number of cloudy days, direction and velocity of wind, relative humidity, and temperature have been taken into consideration with the result that there does seem to be some coincidence between the date of appearance of the disease and the damage resulting, and January temperatures. The other factors do not seem, so far at least, to posses any particular significance.

The mean temperature records and the deviation from the normal for the month of January 1921 and 1931-37 at selected stations in the tobacco areas of Florida, Georgia, South Carolina, North Carolina, and Virginia are shown in the accompanying graphs (Figs. 36 to 40). The mean temperatures and deviations for the same stations for December, January, February, March, and April are presented in Table 12.

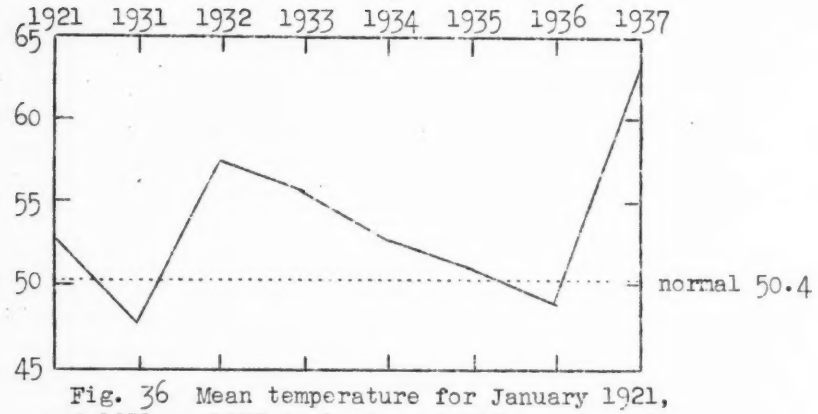


Fig. 36 Mean temperature for January 1921, and 1931 to 1937 inclusive at Tifton, Georgia.

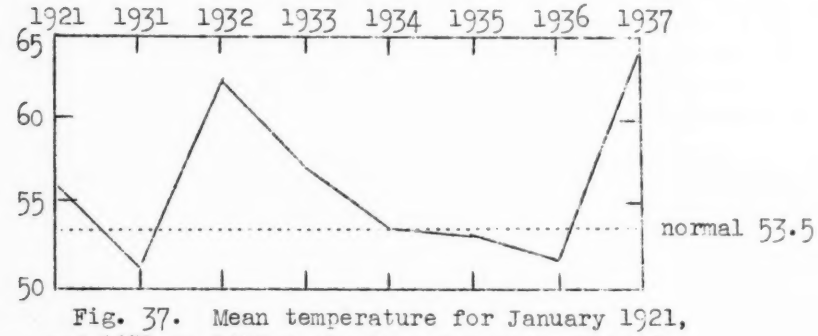


Fig. 37. Mean temperature for January 1921, and 1931 to 1937 inclusive at Quincy, Florida.

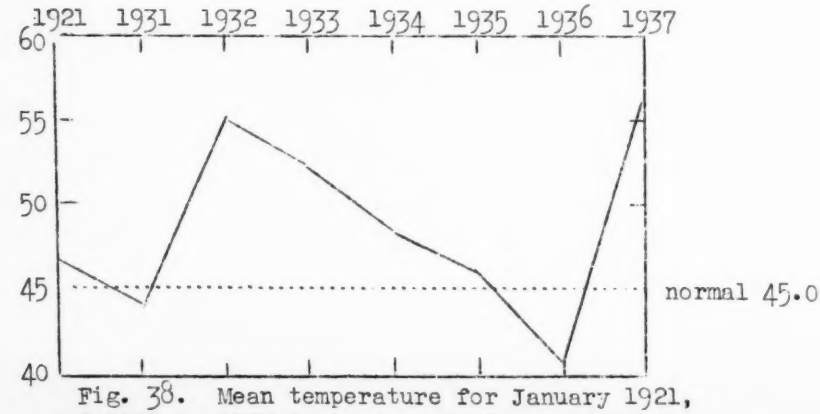


Fig. 38. Mean temperature for January 1921, and 1931 to 1937 inclusive at Florence, South Carolina.

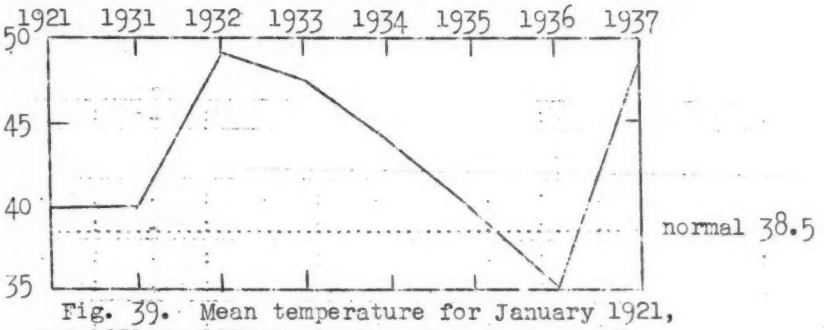


Fig. 39. Mean temperature for January 1921, and 1931 to 1937 inclusive at Oxford, North Carolina.

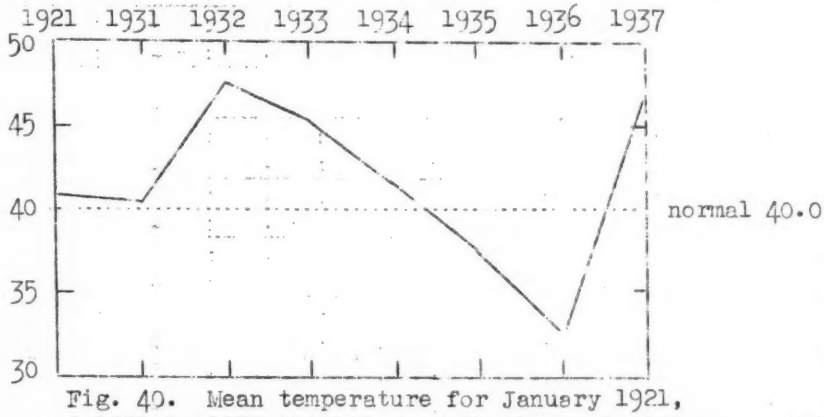


Fig. 40. Mean temperature for January 1921, and 1931 to 1937 inclusive at Chatham, Virginia.

As has already been said, judging from the records in the files of the Plant Disease Survey as well as from the opinions of pathologists, county agents, and farmers throughout the tobacco areas, it seems evident that 1932, 1933, and 1937 have not only been the years of greatest extension of range of the disease, but also of greatest damage. Examination of the temperature records in Table 12 shows that in these years the January temperatures at Tifton, Georgia, Quincy, Florida, and Florence, South Carolina, approached the optimum, 62° F., for mildew initiation. It will be seen also that in the list of the recorded dates of first appearances of downy mildew most of the earliest dates fall in these years (Table 13). On the other hand, interest in this disease was considerably reduced during 1934, 1935, and 1936 when January temperatures were lower (Figs. 36 to 38). In these years downy mildew was later in making its appearance and apparently caused little damage.

Table 12. Mean temperatures and departures from the normal for December to April 1920-21 and 1930-31 to 1936-37 inclusive at five selected stations in tobacco-growing areas in Florida, Georgia, North and South Carolina, and Virginia.3/

Month	1920-21	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37
Tifton, Georgia.								
Dec.	50.5[a]/	46.8	62.2	57.5	58.6	50.3	43.4	53.4
	0.0	-4.5	+10.9	+6.2	+5.1	-3.2	-9.1	+0.9
Jan.	53.2	47.8	57.5	55.6	52.8	51.3	49.0	62.4
	+2.8	-3.3	+6.4	+4.5	+1.0	-0.6	-2.7	+10.0
Feb.	55.2	51.6	61.3	52.6	47.5	52.4	48.4	51.6
	+3.2	-2.3	+7.4	-1.3	-6.8	-1.2	-4.8	-1.5
Mar.	68.4	53.7	54.5	58.2	57.6	64.0	60.8	56.4
	+8.6	-3.9	-3.2	+0.6	+0.6	+6.4	+3.0	-1.3
Apr.	67.4	63.2	68.2	65.0	66.4	67.2	64.5	64.8
	+1.2	-3.5	+1.0	-1.7	+0.1	+0.8	-1.7	-1.3
Quincy, Florida.								
Dec.	51.8	48.4	64.4	60.3	59.2	51.9	46.2	55.6
	-1.9	-5.7	+10.7	+6.6	+5.5	-1.8	-7.5	+1.9
Jan.	56.4	51.2	62.2	57.0	53.4	53.1	51.7	64.4
	+2.9	-2.3	+8.7	+3.5	-0.1	-0.4	-1.8	+10.4
Feb.	56.4	54.4	64.2	55.0	49.6	53.8	50.9	54.2
	+0.6	-1.4	+8.4	-0.8	-6.2	-2.0	-4.9	-1.5
Mar.	66.9	56.6	55.6	60.4	58.1	65.2	62.4	57.4
	+5.7	-4.6	-5.6	-0.8	-3.1	+4.0	+1.2	-3.4
Apr.	65.2	64.9	66.4	65.1	66.0		66.2	64.7
	-1.0	-1.3	+0.2	-1.1	-0.2		0.0	-1.4
Florence, South Carolina.								
Dec.	46.0	44.0	55.4	51.0	52.2	44.4	37.4	47.3
	+1.1	-1.6	+9.6	+5.2	+6.4	-1.4	-8.4	+1.2
Jan.	46.9	44.2	55.2	52.3	48.4	46.0	40.9	56.8
	+1.9	-1.5	+9.6	+6.7	+2.8	+0.4	-5.2	+10.7
Feb.	50.4	47.8	55.2	50.1	39.2	46.8	42.9	48.0
	+4.8	+1.9	+8.0	+2.9	-8.0	-0.4	-4.4	+0.7
Mar.	64.6	49.6	52.7	56.8	52.0	62.6	56.0	53.8
	+8.8	-6.1	-3.0	+1.1	-3.7	+6.9	+0.4	-1.8
Apr.	64.3	60.1	63.2	63.0	64.0	62.4	60.1	61.6
	+1.9	-2.8	+0.3	+0.1	+1.1	-0.5	-2.7	-1.2

3/ To Nellie W. Nance, credit for the tabulating of the temperature records is gratefully acknowledged.

Table 12. (Continued)

Month	1920-21	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37
Oxford, North Carolina.								
Dec.	40.3 -1.6	36.3 -5.6	49.0 +7.1	44.8 +2.9	46.8 +4.9	41.3 -0.6	34.2 -8.0	42.8 +0.6
Jan.	40.0 +1.5	40.0 +1.5	49.2 +10.7	47.6 +9.1	44.0 +5.5	39.8 0.0	35.3 -4.5	48.6 +8.8
Feb.	42.0 -0.4	43.4 +1.0	48.2 +5.8	43.8 +1.4	33.7 -8.7	42.7 -0.7	37.4 -6.0	42.0 -1.4
Mar.	57.4 +7.4	43.8 -6.2	45.3 -4.7	50.0 0.0	46.4 -3.6	62.6 +6.9	52.6 +3.7	47.4 -1.5
Apr.	59.8 +2.2	55.8 -1.8	56.8 -0.8	58.8 +1.2	59.6 +2.0	56.4 -1.0	56.2 -1.2	58.0 +0.6
Chatham, Virginia.								
Dec.	41.8[b/] -0.1	36.3 -5.6	47.8 +5.9	40.6 -1.3	45.2 +3.3	39.6 -2.3	32.6 -9.3	41.2 -0.7
Jan.	40.8 +0.8	40.4 +0.4	47.5 +7.5	45.2 +5.2	41.4 +1.4	37.3 -2.7	32.5 -7.5	46.6 +6.6
Feb.	43.4 +0.3	42.3 -0.8	46.8 +3.7	41.0 -2.1	31.4 -11.6	40.6 -2.5	34.8 -8.3	40.4 -2.7
Mar.	58.9 +11.9	42.8 -4.2	43.9 -3.1	47.0 0.0	44.6 -2.4	53.0 +6.0	51.1 +4.1	44.9 -2.1
Apr.	62.3 +6.0	54.6 -1.7	56.1 -0.2	55.8 -0.5	57.6 +1.3	54.2 -2.1	53.1 -3.2	56.8 +0.5

a/ Tifton not given for 1921, Alapaha used.
b/ Chatham not mentioned in records for 1921, Danville used.

It is realized that if weather conditions later in the year are not favorable, the full effect of January temperature would not be expressed in the development of the disease. On the other hand, if the disease is late in making its appearance, no matter if favorable weather conditions prevail later in the year the actual damage is slight. In 1935, temperatures in January were about normal (Figs. 36-40), downy mildew appeared late (Table 13), and the damage was slight, although the weather was favorable for its development during parts of February, March, and April (Table 12).

It remains to be determined whether or not January temperatures in the future actually do prove to be an index to the possibilities of damage caused by the disease during the following season.

Table 13. Dates of first appearances of tobacco downy mildew in the plant bed, 1931-37.

State:	1931	1932	1933	1934	1935	1936	1937
Fla.	May 8	Feb. 23	Feb. 20			Mar. 30	Feb. 12*
Ga.	Apr. 12	Jan. 21°	Feb. 20		Mar. 7	Feb.	Jan. 25
S. C.		Mar. 30	Mar. 21	Apr. 3	Apr.		Feb. 25*
N. C.	Apr. 27	Feb. 23	Mar. 21	Mar. 15	Apr. 1		Mar. 10*
Va.	May 29	June 8	Apr. 24		May 13		Apr. 20*
Tenn.			May 5		May 3		Apr. 30*
Md.	May	May 31	May 18	May 29		May 11	May 10*
Ky.						June 8	May 13
Pa.		June 15	May 14				
Conn.							May 25
Mass.							June 10*
Ind.							June 13
La.	Mar. 20*						

* Denotes earliest date of appearance for the seven years.
° Found on volunteer plants.
* Approximate date.
(Division of Mycology and Disease Survey).

PEACH CANKERS

E. M. Hildebrand and W. D. Mills

During the past few years it has become increasingly difficult for New York growers to bring young stands of peach trees to maturity. This has been true despite the fact that blossom blight caused by Sclerotinia fructicola has not been so prevalent, perhaps because growers have regularly applied the pink spray (lime-sulphur 1-50) or dust (sulphur). Before the young trees come into bloom and afterward where blossom blight apparently has been under control, the cankers have become a serious problem.

A more careful check-up on the situation in Western New York this year clearly indicates the complexity of the problem since in all cases examined to date, in addition to cold, oriental fruit moth, arsenical, and brown rot injury, the Valsa fungi are commonly found associated with a considerable percentage of the cankers. A variable amount of injury to the terminals has been caused by the oriental fruit moth (Grapholitha molesta Busck) and some of these have been invaded by Valsa. In one instance the brown rot fungus and both Valsa cincta and V. leucostoma were isolated from a single canker. In many other cases only the Valsa fungi or the brown rot fungus were obtained. In view of the work of Willison (Willison, R. S.

Peach canker investigations. II. Infection studies. Canad. Journ. Res. 14:27-44. 1936) in Canada it would appear that a postponement of the pruning operation until growth starts in the spring would eliminate much of the damage from these fungi, since he found that V. cincta was a virulent wound parasite able to infect freshly made wounds during the late autumn, winter, and spring, and to produce perennial cankers. Although V. leucostoma has been obtained more commonly than the other species the exact part played by these fungi in the peach canker complex remains to be determined.

It is not known how widespread or important the peach canker problem may be. However, canker specimens from Michigan have also yielded Valsa. (New York (Cornell) Agricultural Experiment Station).

EXTENT OF BOTRYTIS ROT IN A STRAWBERRY FIELD FOLLOWING FROSTS AND RAINS

Geo. M. Darrow, E. B. Morrow, G. A. Meckstroth, and Chas. Dearing

On April 28, 1937, approximately 21 percent of the berries picked in a Blakemore strawberry field of 1.14 acre near Willard, North Carolina, were discarded because of botrytis rot.

Two weather conditions were of major importance in favoring unusually extensive decay. First, there were low temperatures on March 17 (25°), March 28 (31°), April 1 (32°), April 12 (32°), and April 13 (31°). These frosts and freezes killd the open flowers and small green berries. The dead flowers and berries then became infected with Botrytis sp. and served as abundant sources for later infections. Second, heavy rains April 24 and 25, with additional rains on the nights of April 27 and April 28 (5.87" total for April) created conditions favorable to the spread of Botrytis.

In an attempt to estimate the extent of this unusually severe decay, at the next picking, April 30, pickers were instructed to pick all berries, both sound and decayed.

The plants were spaced, had been mulched lightly with pine needles, and were in a well-drained location. The total weight of the sound fruit was 231 pounds (154 quarts), and of the decayed fruit 221.8 pounds (148 quarts). However, of the fruit picked as sound, a further 12.4 percent was discarded as decayed by those packing the fruit for shipment, which reduced the sound fruit to 202.4 pounds and increased the decayed fruit to 250.4 pounds or approximately 55 percent of the fruit picked on April 30.

Since an examination of the field had shown that the pickers had left much of the decayed fruit, one row -- 1/336 of the total area-- was picked carefully and 1.4 pound of decayed fruit obtained, a per-acre rate

of 471.4 pounds more of decayed fruit or a total of about 78 percent decayed fruit if all fruit had been picked.

The field examination indicated further losses which were impossible to estimate. Many of the flowers and small green berries just starting to develop had also decayed, a loss great or small depending on the "set" of the flowers, the effect of the loss on the later flowering, and the price of early versus that of late fruit.

Owing to the great abundance of the inoculum, a still further loss in the berries shipped from this field might also be expected depending on the temperatures in transit and market, on the time before consumption, and on conditions of handling.

At the next picking, May 3, only 24 percent of the berries were discarded because of decay. In two adjoining fields of Blakemore, where the pickers were instructed to pick all ripe berries, the percentage of decayed fruit from five pickings was as follows:

Date of picking	Field 1 Percentage	Field 2 Percentage
April 28	11	15
April 30	39	40
May 3	25	19
May 5	11	10
May 7	9	6
Average	22.5	22.3

Observations in commercial fields throughout the section indicated that the prevalence of botrytis rot was about the same as described here. (Division of Fruit and Vegetable Crops and Diseases).

FRUIT DISEASE ERADICATION ACTIVITIES

Reported by the Bureau of Entomology and Plant Quarantine (June 1).

CITRUS CANKER ACTIVITIES: Inspection for citrus canker and the destruction of abandoned groves and of Citrus trifoliata was begun in west Florida in April. This is a continuation of the project in the contiguous area in southern Mississippi and Alabama where thorough inspection has been made of the entire citrus-growing districts, comprising eight counties. No canker was found in these recent inspections; however, over 5,000,000 worthless citrus trees have been destroyed in Mississippi and Alabama up to April 24, under the emergency project. In Louisiana and Texas persistent search for the canker is continued from year to year in all citrus-growing areas

in order to find and eradicate the last vestige of this disease. In Louisiana the disease was found in April on one tree in Saint Charles Parish. Only three infected properties were found in that State in 1936. In Texas, although the disease has recently recurred on several properties in Galveston and Brazoria Counties and to a less extent in Harris County, the infected trees are chiefly seedlings of recent growth. These infected trees are promptly removed and the areas reworked with relief crews. The inspection work is conducted cooperatively with the States concerned.

PEACH MOSAIC DISEASE: Cooperative Federal-State inspection for the peach mosaic disease in the infected States is well under way with a force of 75 inspectors. In Colorado the present indications are that there is approximately one-fifth as much mosaic in the affected area as was found last year. Such decline of the disease is apparently due to the prompt and complete eradication of infected trees in 1935-36. Reports from Texas state that in the El Paso district eradication work is being performed on 90 percent of the properties on which the disease occurs. Eradication is being conducted along with the inspection as soon as the consent of the owners is obtained. In the eastern half of Texas 12 inspectors are inspecting the 5-mile zones surrounding nurseries and the sources of budding wood used in such nurseries. A disease-free radius of 5 miles, as determined by careful and competent inspection, is required as a standardized condition of certification for shipping from infected areas, under recently established State quarantines. The California survey indicates an increase in the disease of one to five times over that of last year. The tree-removal project is continued cooperatively with the State, providing employment for approximately 125 workers. Good cooperation is being obtained from owners of infected properties. So far as is known, California and Colorado are the only States where the disease exists in extensive commercial peach areas. Infections in other States, namely, Arizona, New Mexico, Utah, and Texas, are confined to areas not so important commercially. The results of the field work of the past two seasons indicate that if inspection and eradication are continued the spread will be checked and the disease eradicated before extensive economic losses are sustained.

ADDITIONAL BREEDING AREAS OF BEET LEAFHOPPER FOUND IN TEXAS

V. E. Romney, of the Phoenix, Arizona, laboratory, reports that, as the results of a recent survey, additional breeding areas of Eutettix tenellus Bak., involving 2,700 square miles of territory were added to the known breeding areas north of the Rio Grande in Texas. This survey was performed primarily to determine the source of the curly-top disease epidemics in spinach fields. These epidemics have assumed critical importance in the Crystal City district of Texas. Survey data indicate that the source of the leafhoppers that infest spinach fields near Crystal City begins about 30 miles southwest of Dryden, Texas, and continues along the foothills up to

the Rio Grande for approximately 360 miles. The beginning of the breeding area is apparently 180 miles west-northwest of Crystal City. Known breeding areas of the leafhopper now occupy approximately 10,700 square miles north of the Rio Grande in New Mexico and Texas, in addition to the unknown extent of adjacent areas in Mexico. (Bureau of Entomology and Plant Quarantine).

POTATO DISEASE SURVEY IN OKLAHOMA

T. B. Gordon

A rather hurried trip was taken through the commercial white potato section of Oklahoma from May 25 to June 2, 1937. No attempt was made to ascertain the actual percentage of infection of the various diseases, but rather general information as to presence or absence and whether infection was local or widespread, and whether it was slight or prevalent.

Fields were examined in Bryan, Choctaw, McCurtain, LeFlore, Haskell, Muskogee, Wagoner, and Okfeskee Counties.

Generally speaking conditions in the fields observed were practically uniform. There was a variable amount of mosaic over the entire section, from practically none in a few fields to very prevalent in many, but with only a slight infection in most fields. Spindle tuber was less noticeable, but was found over the entire area and was also variable. Rhizoctonia was found over the entire area, but to no great extent except in fields which had been in potatoes for several years previously. Tip burn also occurred throughout the area, but was apparently not causing any great damage at that time. Wilt (Fusarium sp.), which in the past has caused much loss to potato growers, was scattered over the area, but was found only in spots in the fields. Blackleg (Bacillus phytophthorus) was found in only one location, in LeFlore County. Scab (Actinomyces scabies) was found to a very limited extent on this trip; however, at harvest about two weeks later, several fields in the Muskogee district were found to be heavily infected, especially where the fields had been in potatoes before.

Diseases noted and the counties where they were observed:

Spindle Tuber	Rhizoctonia	Mosaic	Tip Burn	Wilt	Black Leg	Scab
Bryan	Bryan	Bryan				
Choctaw	Choctaw	Choctaw				
McCurtain	McCurtain	McCurtain	McCurtain	McCurtain		
LeFlore	LeFlore	LeFlore	LeFlore	LeFlore	LeFlore	
Haskell	Haskell	Haskell	Haskell			Haskell
Muskogee	Muskogee	Muskogee	Muskogee	Muskogee		Muskogee
Wagoner	Wagoner	Wagoner	Wagoner	Wagoner		
Okfuskee	Okfuskee	Okfuskee	Okfuskee	Okfuskee		

Potatoes not dug until late in the season, especially those harvested after July 1, were in many cases severely affected, apparently by heat. The tubers first lost their turgidity which was followed by a slight discoloration of the tissues, and later on an internal breakdown.

In order to improve the quality of potatoes grown in Oklahoma, a quarantine regulation was drawn up effective January 13, 1937, setting forth specific standards for propagation stock. It is readily conceded that this document is not perfect, but it has been the means of securing better seed stock and, thereby, improving the crop as a whole.

During and a few weeks before the planting season all carlots and truck loads of potato seed were examined to see that they met the Oklahoma standards. Out of 755 carlots of potatoes shipped into Oklahoma for "seed stock" 33 were rejected for cause principally on account of fusarium wilt, fusarium tuber rot, and also scab.

It is rather interesting to note that after the first concerted effort to inspect the potatoes shipped into Oklahoma for seed purposes, the U. S. Department of Agriculture through the Federal Statistician in Oklahoma estimates the per acre production as 105 bushels for this year, when last year the per acre yield was only 80, and the ten year average was 97 bushels. (Oklahoma State Board of Agriculture).

LOSSES FROM POTATO DISEASES IN NORTHERN FLORIDA, 1932-37

With his annual report on potato diseases in the Hastings potato-growing section of Florida for 1937, A. H. Eddins included the accompanying tabulation (Table 14) comparing losses for the six years 1932 to 1937.

Table 14. Losses from potato diseases in the Hastings section, Florida, 1932-37.

Disease	Loss from Potato Diseases--Percent					
	1932	1933	1934	1935	1936	1937
Late Blight	2.0	15.0	8.0	0.0	4.0	15.0
Rhizoctonia	2.0	4.0	5.0	4.0	3.0	2.0
Brown Rot	1.5	2.0	3.0	8.0	2.0	1.0
Early Blight	0.5	t	0.5	t	t	t
Common Scab	0.5	0.5	0.5	0.5	0.5	0.5
Sclerotinia Rot	---	t	0.5	t	t	t
Southern Wilt	0.5	0.5	0.5	0.5	t	t
Blackleg	---	0.5	0.5	0.5	2.0	4.0
Fusarium Seedpiece Rot	---	---	t	t	0.5	t
Mosaic and Virus	1.5	1.0	1.0	1.0	1.0	1.0
Bacterial Wilt and Soft Rot	---	---	---	---	---	5.0
Water Rot	---	---	---	---	---	2.0
Total	8.5	23.5	19.5	14.5	13.0	30.5

The loss for 1937 is greater than for any other of the six years, owing to general and severe infection with late blight throughout the season and to increased loss from tuber rot caused by three bacterial diseases.

Late blight (Phytophthora infestans) was much more prevalent than usual. Weather favored its development--hot in January and cold in March and April, with frequent rains and cloudy skies. The seed was severely infected. Some fields were replanted because 60 to 90 percent of the seed or seedlings were killed. There was more effort to control late blight by the use of copper-lime dust than at any previous time since potatoes have been grown at Hastings. The disease was first observed on January 2 at Federal Point in Putnam County. The total loss from reduction in yield in this section is estimated at 7 percent, and tuber rot caused an additional loss of 8 percent. The Katahdin variety was resistant, while Spaulding Rose was very susceptible.

Blackleg (Bacillus carotovorus /B. phytophthorus/) is normally of slight importance but this year it was much more prevalent than usual. The total loss was 4 percent of which 3 percent was due to tuber rot. The date of first observation was March 15 at Federal Point when the crop was nearing maturity.

Water rot (B. carotovorus) occurred in low places in poorly drained fields and caused 2 percent loss from tuber rot. It was also much more prevalent than usual.

The bacterial wilt and soft rot which was reported by Bonde from Maine and is apparently caused by an organism very closely resembling Bacillus carotovorus (Bonde, Reiner. A bacterial wilt and soft rot of the potato in Maine. Phytopath. 27:106-108. Jan. 1937) was found in this section for the first time this year, the first observation being on April 5 at Bunnell, Flagler County. It was favored by rains during the last ten days of the growing period and caused a loss of 5 percent.

Brown rot and rhizoctonia, which are normally of some importance, were considerably reduced in prevalence this year. Low temperatures during March and early April and also killing of the plants by late blight prevented infection by brown rot (Bacterium solanacearum). The disease was not observed until April 15, at West Tocoi, in Clay County. Rhizoctonia (R. solani) was observed early, on January 2 at Federal Point, but conditions were especially favorable for quick germination of the seed and growth of the plants, thus preventing injury to the crop from burning of the stems. The disease caused greatest injury as the plants were nearing maturity.

Among the diseases of minor importance in this region common scab (Actinomyces scabies) and mosaic and other virus diseases caused the usual

slight amount of loss, while early blight (Alternaria solani), fusarium seed piece rot (Fusarium spp.), sclerotinia rot (S. sclerotiorum), and southern wilt (Sclerotium rolfsii) were even less prevalent than usual this year. (Florida Agricultural Experiment Station).

/NOTE: A report on potato diseases in Dade County, by Geo. D. Ruehle, was given in the April 15 issue, pages 113-114/.

ADDITIONAL NOTES ON DOWNY MILDEW AND OTHER DISEASES OF ONION IN NEW YORK

That spores from early diseased plantings are of importance in the initiation of epiphytotics of downy mildew (Peronospora destructor) is indicated by the fact that they have recently been caught on 10 out of 34 slides (spore traps) exposed over night up to .4 of a mile from the nearest onions. Evidence supports a belief these spores can survive a trip of 5 miles through the air and remain viable under certain weather conditions not uncommon this year. (A. G. Newhall, July 26).

The continued drought of the past two weeks has held back the spread of onion mildew but since most fields were already pretty thoroughly infected, the drought came too late to do much good in most counties. The advent of cooler weather of the last few days with its accompanying heavy dews has started the fungus off again with abundant sporulation.

Another thing the hot weather brought on which is taking heavy toll in many fields is the spread of blights caused by Macrosporium parasiticum, a weak parasite, causing death of outer leaves and tips, and by M. porri, which causes death of healthy leaves from the point of attack out to the tip.

In many fields where these fungi are not so prevalent the drought has caused considerable tip burn (blast or dieback) which is going to reduce yields considerably, and will be followed by the Macrosporium blights in most cases. All in all the yield of large well matured bulbs will be an uncommon sight in most of the onion counties and the markets will probably be flooded with picklers and small onions. (A. G. Newhall, Ithaca, August 2).

Orange County: The weather has been very favorable for the spread of mildew and some sections are very badly hurt. (C. C. Davis, July 26).

Wayne County: The few set onions grown in the county are down, mildew having cut the yield considerably. Much of the crop has already been harvested. Mildew continues to spread in seed onions. The extent of the damage cannot yet be determined. Particularly those fields near set onions, are almost completely down. (L. E. Curtis, July 26).

STEM RUST IN MINNESOTA AND NORTH AND SOUTH DAKOTA

E. C. Stakman reported as follows in telegrams to the Bureau of Entomology and Plant Quarantine:

Recent observations and reports indicate that at least 50 percent of the spring wheat in Minnesota is Thatcher. Northeastern South Dakota and southeastern North Dakota very severely damaged by rust. Northward from Fargo and Moorhead rust decreased and some fields are approaching hard dough with prospects for approximately 25 percent damage. Later fields may be damaged more. Some good Ceres probably in western Grand Forks and Sargent Counties. Rust increased rather rapidly on Durums south of Valley City, but northward infection is still light and the outcome is uncertain. (July 22).

Damage to susceptible wheats in northeastern South Dakota and southeastern North Dakota approximates 50 to 60 percent; near Fargo probably 30 percent; northward still uncertain. Rust is now heavy on Durums in northeastern South Dakota and southeastern North Dakota but lighter northward in principal Durum area. Thatcher is still resistant. (July 29).

PLANT DISEASES REPORTED IN OHIO

A. L. Pierstorff

Wheat in western and northwestern Ohio is very generally infected with stem rust (Puccinia graminis), but the infections came later than would be the case had the inoculum been derived from barberry. Generally the rust was in the red stage at harvest time. There is a lot of shriveled wheat and some threshed does not weigh more than 43 pounds to the bushel. However, all the shriveling cannot be blamed on black stem rust. Leaf rust (P. rubigo-vera tritici) injury was very severe and practically all the leaves were dried up and shriveled on the wheat plant long before the wheat was mature. Probably as much injury was caused by leaf rust in the State as by stem rust. In some sections scab (Gibberella saubinetii) could be found very easily, although the severity of the infection did not equal that present in former years. Barley had plenty of scab and some stock-men are at a loss as to whether or not to feed it. Oats were not infected with stem rust. One patch of Andropogon repens was found severely infected with ergot (Claviceps purpurea). Stover found some ergot in rye.

We get complaints every day on apple scab (Venturia inaequalis) and we are going to have lots of scabby apples on the market in the fall. Blight (Bacillus amylovorus) is very severe and earlier we received many samples of cedar rust (Gymnosporangium sp.). Plums and peaches rotted earlier this year than I ever saw them in Ohio (Sclerotinia fructicola).

Coryneum beijerinckii has been found very abundant on peach in the northern portion of the State and we have received some samples from Lawrence County. Black rot (Guignardia bidwellii) and downy mildew (Plasmopara viticola) are present in practically every vineyard in central and southern Ohio and in many areas along the Lake. Our raspberries and strawberries were of good quality, although at times the strawberry crop in northern Ohio received too much rain.

Some of our tobacco is infected with wild fire (Bacterium tabacum) and we have also received specimens of fusarium wilt (F. oxysporum nicotianae). I would say that fusarium wilt is more generally distributed through the dark tobacco area than I have seen it for ten years.

Our vegetable growers have suffered equally with the fruit growers, and one finds diseases on most all crops. Tomatoes particularly are heavily infected with Septoria (lycopersici) and Alternaria (solani). (Extension Pathologist, July 26).

WHITE PINE BLISTER RUST

Reported by the Bureau of Entomology and Plant Quarantine (June 1).

Spread of blister rust: Blister rust (Cronartium ribicola) infection on pine has been reported for the first time in Monroe and Sauk Counties, Wisconsin. In Monroe County one blister rust canker was discovered on April 12, and in Sauk County three cankers were located on April 13. This is the first time blister rust has been found in Monroe County, either on pine or Ribes, whereas in Sauk County infection on Ribes had been previously reported.

Pine-infection surveys: Pine-infection surveys have been carried on recently in the North Central region in the St. Paul district of Minnesota and in Upper Michigan. In these surveys pines were examined for blister rust cankers and were recorded as not infected, infected, or too large to inspect. Data were also obtained on the number of cankers by probable years of origin. In Minnesota, during the month of April, 978 pines were examined by a two-man crew. The percentage of infected trees found was 5.32. In the three Michigan Counties of Dickinson, Menominee, and Marquette, five plots were laid out in protected areas and five in unprotected areas. The protected areas showed 5.6 percent of the trees infected, of which 97.4 percent were clearly infected prior to 1934 when Ribes eradication was performed. The five plots established in unprotected areas showed an average of 35 percent of the trees infected. The majority of cankers found were on wood of 1933-35 growth.

Phenological data on blister rust: L. W. Hodgkins reports that several fruiting blister rust cankers were observed in Massachusetts during the early part of April. One canker was found fruiting on March 28, which is very early for this region. In Virginia aecia were found just protruding through the bark of white pine on March 25. Cultivated gooseberries were reported to be leafing out in Franklin County, in southern Virginia, on February 19. A report from Michigan states that Ribes leaves were starting on plants along the lake shore on May 1, but farther inland the leaves had not yet appeared nor had the blister rust cankers reached the fruiting stage.

DUTCH ELM DISEASE ERADICATION

(Bureau of Entomology and Plant Quarantine weekly reports).

(July 10). The first case of Dutch elm disease was reported in West Virginia at Wileys Ford near the Western Maryland railroad tracks and Potomac River south of Cumberland, Maryland.

(July 17). Two additional trees in Wileys Ford, West Virginia, were confirmed. One was near the tree reported last week and the other about six miles distant but near the Western Maryland Railroad tracks and the Potomac River.

(July 24). The number of confirmations to date this scouting season is 24.2 percent below confirmations for a similar period in 1936. A reduction of 41.6 percent is reported for New York. The following tables show the percentages for each State:

The period for the computations are: for 1936, May 30 to July 25, inclusive, and for 1937, May 29 to July 24, inclusive.

State	Confirmations 1936	Confirmations 1937	Comparative Percent
Connecticut	57	54	- 5.3
New Jersey	2,519	2,070	-17.8
New York	1,034	604	-41.6
Outside States	15	20	+25.0
Totals	3,625	2,748	-24.2

DISEASES OF TREES OBSERVED THIS YEAR

R. P. White

Anthracnose of Planes and Oaks: The anthracnose diseases of planes and oaks (Gnomonia veneta) are unusually severe in New Jersey this season, particularly in the southern part of the State. As usual, in an epidemic year, the native plane, Platanus occidentalis, and the white oak, Quercus alba, are severely infected. In addition to these two species the London plane, Platanus acerifolia, is heavily infected in the southernmost counties of Cape May and Cumberland. It is very unusual to see any amount of anthracnose on this tree, and we have considered it fairly resistant. This year's experience, however, would indicate otherwise. On certain trees every leaf was infected early in its growth, and complete defoliation resulted. Twig cankers were produced in abundance upon which sporulation was present, and large numbers of these infected twigs were killed.

Reports from neighboring states indicate the anthracnose diseases of shade trees to be severe this year, and evidently this condition exists along the Atlantic seaboard to Massachusetts.

The future of twig cankers is important in the future epidemiology of these diseases. It has repeatedly been observed that these twig cankers which do not girdle the twigs heal over during the two years following their formation. This would indicate that the fungus does not overwinter here. However, sporulation has been found on such cankers the spring following their formation, and at least one crop of spores is produced which serve to initiate the disease the following spring.

This disease is dependent upon frequent rainfalls or high humidity during the time the leaves are young and growing. Without this combination of high humidity and soft succulent tissues the disease is not severe. Periodically these conditions are satisfied, however, and we have an epidemic as was experienced this year. The last serious outbreak of this trouble in New Jersey occurred in 1935, only two years ago.

Control is obtained by spraying trees which were seriously infected the previous year with lime-sulfur 1-9 as a dormant spray, plus at least two applications of 3-4-50 Bordeaux a week to ten days apart during leaf growth. With this year's heavy production of twig cankers which will be producing spores next spring, it would seem advisable to follow this spray program in 1938 on trees of white oak, London and native plane, of shade or ornamental value.

Willow scab: Willow scab (Fusicladium saliciperdum), prevalent throughout New England and Eastern New York is apparently very severe this year. Willows were noted in many instances completely defoliated, with

numerous dead branches and stag-heads. It is only a question of time until this disease, which has worked its way down into the states from Nova Scotia, hits New Jersey.

Bordeaux mixture early in the spring is recommended as a control. However, along the New Jersey shore, due to continued high humidities, this may not be effective. In one case on Nantucket Island, trees were sprayed weekly with Bordeaux from before the time the buds broke until fall, without doing more than keep the trees alive a few extra years when compared with neighboring trees.

Fortunately there are indications that Salix babylonica, most widely used as an ornamental subject is highly resistant.

Verticillium on elms: Throughout northern Vermont many of the elms are showing stag-heads, yellow flags, and wilting. During 1933 and 1934 numerous specimens of elms in this section were received from tree experts, fearful of the Dutch elm disease. In all cases Verticillium was isolated. In this section this disease is causing the loss of many fine elm specimens. (Nursery Disease Notes, New Jersey Agricultural Experiment Station).

BRIEF REPORTS ON PLANT DISEASES

DOWNY MILDEW ON GRAPES IN OHIO: Because of heavy rains and cloudy weather in early summer there is a great deal of downy mildew (Plasmopara viticola) on grapes. Catawbas seem to be most affected. (E. W. Mendenhall, July 23).

SOOTY BLOTCH ON WILD BLACKBERRY IN PENNSYLVANIA: C. L. Zundel sent a specimen of sooty blotch (Gloeodes pomigena) collected along the Susquehanna River at Herndon, Northumberland County, in May. He reported it as abundant.

DOWNY MILDEW ON CAULIFLOWER ON LONG ISLAND: Downy mildew of crucifers (Peronospora parasitica) has been prevalent in cauliflower seed beds on Long Island throughout the season. Considerable damage has been done to plants in the later planted beds. (H. S. Cunningham, July 17).

CUCURBIT BACTERIAL WILT ON LONG ISLAND: Most of the cucumber fields in Suffolk County are now showing evidence of bacterial wilt (Bacillus tracheiphilus). In some of the fields 3 percent of the plants are now showing infection. One field of Hubbard squash has been found showing a few infected plants. (H. S. Cunningham, July 22).

SEVERE DAMAGE FROM BACTERIAL BLIGHT (BACTERIUM PHASEOLI) OF BEAN IN OKLAHOMA: I examined two fields in Muskogee County near Fort Gibson. The

plants were much dwarfed and practically no pods were observed. A large canning factory reported that they had about 300 acres contracted in the same area apparently similarly affected. Varieties planted were reported as Giant Stringless Greenpod and Full Measure. (T. B. Gordon, June 23).

ASHY-STEM BLIGHT OF BLACKEYE COWPEA IN TEXAS: P. A. Young sent a specimen of ashy stem blight on blackeye cowpea collected in Cherokee County, July 31, with the remark that it was a serious disease in that locality. J. A. Stevenson identified the fungus, Macrophomina phaseoli (Maubl.) Ashby. The sclerotial stage, Rhizoctonia bataticola, was also present.

COTTON RUST IN TEXAS: Cotton affected by Aecidium gossypii Ell. & Ev., the aecial stage of Puccinia schedonnardi Kellerm. & Sw., was sent in by G. H. Godfrey of the Weslaco Station, Texas. He reported that a trace was present in all fields examined.

The Puccinia stage was collected on Muhlenbergia schreberi in Washington, D. C., by C. A. Ludwig, August 1.

CRATAEGUS DISEASES COLLECTED IN VIRGINIA: H. A. Edson collected specimens of powdery mildew (Podosphaera oxyacanthae), quince rust (Gymnosporangium clavipes), and apple rust (G. juniperi-virginianae) in the Shenandoah National Park, July 17.

LITERATURE NOTES

THE PLUM TREE A CARRIER OF THE PEACH MOSAIC VIRUS: E. W. Bodine and L. W. Durrell report in Science that Maynard plum trees have been found to be carriers of the peach mosaic virus in the Palisade district of Colorado, although these trees do not show the symptoms evident in the peach. (Bodine, E. W. and L. W. Durrell. The Maynard plum--a carrier of the peach mosaic virus. Science N. S. 86:81. July 23, 1937).

CAUSE OF DOLLARSPOT DISEASE OF TURF: The organism causing the dollarspot disease has been thought to be a species of Rhizoctonia different from R. solani. F. T. Bennett reports that the cause of the disease in Britain, North America, and Australia, is a new species of Sclerotinia, which he describes under the name S. homoeocarpa. The fungus exists as a number of distinct strains, one of which yields ascospores and conidia, another ascospores only, and others reduced sporiferous structures only. (Bennett, F. T. Dollarspot disease of turf and its causal organism, Sclerotinia homoeocarpa n. sp. Ann. Appl. Biol. 24:236-257. 1937).

A LIST OF MISSOURI FUNGI: W. E. Maneval is the author of a list of Missouri fungi. (Maneval, W. E. A list of Missouri fungi, with special reference to plant pathogens and wood-destroying species. Univ. Missouri Studies 12, no. 3. 150 pp. July 1, 1937).

PLANT DISEASE FUNGI AS A CAUSE OF ASTHMA: F. W. Wittich and E. C. Stakman report a case of asthma found to be due to cereal smuts. The patient reacted positively to scratch and puncture tests with extracts of Tilletia tritici, T. levis, Ustilago tritici, U. hordei, U. nuda, U. avenae, U. crameri, U. zeae, Urocystis occulta, Sphacelotheca sorghi, S. cruenta, and Puccinia graminis tritici. The authors suggest that these fungi may be as important a cause of respiratory allergy as the commoner molds in cereal-growing areas. (Wittich, F. W., and E. C. Stakman. Case of respiratory allergy due to inhalation of grain smuts. Journ. Allergy 8:189-193. No. 2. 1937).